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HUMAN RESOURCES

**ANALYSIS OF RACIAL DIFFERENCES IN TERMS OF
WORK ASSIGNMENTS, JOB INTEREST, AND FELT UTILIZATION
OF TALENTS AND TRAINING**

By
Raymond E. Christal

**PERSONNEL RESEARCH DIVISION
Lackland Air Force Base, Texas**

January 1972

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FOREWORD

This study was accomplished under Project 7734, Development of Methods for Describing, Evaluating, and Structuring Air Force Occupations; Task 773405, Derivation of Methods to Provide for Career Progression and Development of Air Force Personnel. It is a by-product of a larger study of first-term airmen being conducted by Dr. L. N. Wiley and Mr. K. B. Gould. Appreciation is expressed to Mrs. M. Joyce Georgia for computational assistance in establishing the tables.

This report has been reviewed and is approved.

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13. ABSTRACT First-term Black airmen were compared with first-term Non-Blacks in 11 career ladders in terms of their work assignments, job interests, and felt utilization. The unique contribution of race in accounting for the number of tasks assigned and for the average difficulty level of tasks performed per unit time was not significant in any of the ladders. Race did make a unique contribution in predicting an overall job difficulty index in two ladders, but in each instance this contribution was less than one percent. There appeared to be no practical differences in the types of assignments given to Blacks and Non-Blacks within the 11 ladders investigated. Blacks in the 291X0 Communications Center and 702X0 Administrative ladders reported a higher level of job interest and a higher feeling of utilization. Again, these differences were significant, but were relatively small.		

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ABSTRACT

First-term Black airmen were compared with first-term Non-Blacks in 11 career ladders in terms of their work assignments, job interests, and felt utilization. The unique contribution of race in accounting for the number of tasks assigned and for the average difficulty level of tasks performed per unit time was not significant in any of the ladders. Race did make a unique contribution in predicting an overall job difficulty index in two ladders, but in each instance this contribution was less than one percent. There appeared to be no practical differences in the types of assignments given to Blacks and Non-Blacks within the 11 ladders investigated. Blacks in the 291X0 Communications Center and 702X0 Administrative ladders reported a higher level of job interest and a higher feeling of utilization. Again, these differences were significant, but were relatively small.

SUMMARY

Christal, R.E. *Analysis of racial differences in terms of work assignments, job interests, and felt utilization of talents and training.* AFHRL-TR-72-1. Lackland AFB, Tex.: Personnel Research Division, Air Force Human Resources Laboratory, January 1972.

Problem

This study reports data analyses for first-term airmen in 11 career ladders to determine whether there are differences in work assignments and job attitudes of Blacks and Non-Blacks.

Approach

The general approach involved application of the multiple linear regression model to determine the relationships between race and selected criteria, holding constant such variables as aptitude, time in military service, technical school graduation status, and time on the job.

Results

No racial differences were observed in the number of tasks being performed or in the average difficulty of tasks performed per unit time. However, when these two factors were weighted into an overall job difficulty composite, it was found that the Blacks were performing slightly less difficult jobs in two of the career ladders: 605X0 Air Passenger/Air Cargo and 702X0 Administrative. Significant differences in job interest and felt utilization were found in two ladders, 291X0 Communications Center and 702X0 Administrative; in each instance, these differences were in the direction of Blacks finding their jobs more interesting and feeling a greater utilization of their talents and training than Non-Blacks.

Conclusions

Only a small proportion of the job assignment variance could be accounted for by all variables in the system. The unique contribution of race was significant in two ladders, but in each instance this contribution was less than one percent. There appear to be no practical differences in the types of assignments given to Blacks and Non-Blacks in the 11 ladders investigated. Blacks in the 291X0 and 702X0 areas reported higher job interests and a higher feeling of utilization. Again, these differences were significant, but were relatively small.

This summary was prepared by R. E. Christal, Occupational and Career Development Branch, Personnel Research Division, Air Force Human Resources Laboratory.

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ANALYSIS OF RACIAL DIFFERENCES IN TERMS OF WORK ASSIGNMENTS, JOB INTEREST, AND FELT UTILIZATION OF TALENTS AND TRAINING

I. INTRODUCTION

This paper is a by-product of a larger study of 11 career ladders in which the goal was to determine whether the difficulty level of work assigned first-term airmen is associated with aptitude level. Since approximately 19 percent of the cases in this study were Black, it provided an ideal set of data for analyzing racial differences on variables such as the difficulty level of work assigned, job interest, and felt utilization. Other papers will describe various aspects of the first-term airman study. This paper is limited to a brief analysis of racial differences on selected job-related variables.

II. DESCRIPTION OF THE SAMPLES

The 11 career ladders in the first-term airman study each have had a high input of individuals classified as New Mental Standards Airmen, that is, individuals who scored between the 10th and 30th centiles on the Armed Forces Qualification Test (AFQT). Job inventories were prepared and administered to over 14,000 individuals by name in order to obtain a good definition of the work being performed by each case. Each individual completed a general background information section in which he provided data concerning his identification, job location, education, months on the job, months in the career ladder, months in the service, courses taken, equipment worked on, tools utilized, and so on. In this section he also indicated the extent to which he finds his job interesting or dull; the extent to which he feels his present job uses his talents and his training; and his reenlistment intentions. In the job inventory proper, he checked every task in his present job, and indicated how his work time is distributed among the tasks. Identification information obtained from the survey was used to match against personnel files in order to obtain data on variables such as test scores.

The present study included only 11,380 cases for whom complete data could be obtained. As shown in Table 1, the proportion of Blacks in the various samples varied from 8.36 percent in the

Vehicle Maintenance Ladder (473XX) to 23.83 percent in the Fire Protection Ladder (571XX). Table 2 describes the various samples in terms of values on selected variables. It should be pointed out that the samples included an over representation of airmen in AFQT Mental Categories I (AFQT scores within the 93-99 centile range) and IV (AFQT scores within the 10-30 centile range), and an under representation of airmen in Mental Categories II (AFQT scores within the 65-92 centile range) and III (AFQT scores within the 31-64 centile range). The disproportionate number in Category IV was due to an effort to obtain data on as many New Mental Standards Airmen as possible. The number of airmen in Category I assigned to these ladders was so small that it was necessary for this group to be over sampled in order to obtain stable relationships in the main study.

III. APPROACH

The general approach involved application of a multiple linear regression model (Bottenberg & Ward, 1963) to determine the relationships between race and selected criteria, holding constant such variables as aptitude, time in military service, technical school graduation status, and time on the job. Two separate regression equations were computed for each specialty-criterion combination: one with race included among the predictors, and one with race excluded from the predictor set. By observing differences in the resulting R^2 s, one can determine whether Blacks score lower or higher than Non-Blacks on a particular criterion, other factors held constant.

IV. RESULTS

Table 3 presents the zero-order relationships between race (where 1 = Black and 0 = Non-Black) and other variables included in the analysis. As has been noted in previous studies, Blacks tended to score significantly lower than Non-Blacks on all aptitude tests. These negative relationships were strongest against the AFQT; but this is explained

at least in part by a restriction in range on the aptitude composites of the Airman Qualifying Examination (AQE) due to selection. A number of other statistically significant relationships are shown throughout the table, although in many instances the size of the correlation coefficients indicates that these differences were very small. A unique finding is that Blacks in several ladders reported significantly better utilization of their training and talents than Non-Blacks. Finally, in seven ladders, a significantly greater proportion of Blacks than Non-Blacks indicated an intention to reenlist.

Direct interpretation of a zero-order correlation coefficient is dangerous, since a relationship may be induced by a third variable. For example, in a particular sample it might be found that Blacks are being assigned less difficult tasks than Non-Blacks. However, this might be explained by the fact that Blacks within the sample have a smaller average number of months in service. By computing regression equations with race in and out of a predictor set, one can determine whether there are racial differences on a criterion which cannot be accounted for by other variables in the system.

Table 4 presents the predictor variables associated with each of the five criteria used in this study. For each criterion, two equations were computed: one with the predictor set shown in Table 4 and one with a race variable (where 1 = Black and 0 = Non-Black) added to the predictor set shown in Table 4. Results of these analyses are presented in Table 5.

Table 1. Distribution of Samples By Race

Air Force Specialty Code	Total N	Non-Black N	Black N	Percent Black
291X0	691	608	83	12.01
473X0	538	493	45	8.36
543X0	373	305	68	18.23
551X0	643	506	137	21.31
571X0	1,003	764	239	23.83
605X0	714	612	102	14.29
631X0	724	556	168	23.20
645X0	1,379	1,217	162	11.75
647X0	1,262	583	279	22.11
702X0	1,944	1,497	447	22.99
811X0	2,109	1,617	492	23.33
Total	11,380	9,158	2,222	19.53

Table 2. Description of Samples on Selected Characteristics

Variable		Air Force Specialty										
		291	473	543	551	571	605	631	645	647	702	811
Grade	M	3.41	3.45	3.31	3.43	3.35	3.49	3.39	3.32	3.50	3.38	3.56
	SD	.50	.51	.47	.51	.50	.51	.51	.50	.52	.50	.52
Total Months Active Military Service	M	22.60	23.02	23.08	24.45	23.15	23.61	22.03	20.88	24.64	23.42	22.69
	SD	6.48	5.48	5.18	6.45	6.06	7.28	6.56	5.87	6.35	6.23	7.10
Percent CONUS Assignment		41.39	73.61	25.47	76.67	52.54	36.69	37.57	65.77	64.50	66.82	41.35
Percent Technical School		80.17	31.97	94.91	72.94	48.16	93.28	59.53	95.21	58.80	52.73	63.73
Years of Education	M	12.60	12.20	12.10	12.08	12.05	12.27	12.27	12.76	12.22	12.39	12.29
	SD	1.09	.87	.85	.72	.93	1.01	.91	1.31	.88	1.07	.97
Percent Blacks in Sample		12.01	8.36	18.23	21.31	23.83	14.29	23.20	11.75	22.11	22.99	23.33
Age	M	19.66	19.53	19.58	19.65	19.59	19.67	19.61	19.92	19.59	19.61	19.56
	SD	1.26	.98	1.05	1.16	1.10	1.15	1.14	1.38	1.14	1.20	1.56
AFQT Score	M	50.65	56.14	44.10	40.34	38.54	45.71	36.98	51.65	36.59	37.17	43.09
	SD	25.31	26.67	25.34	25.03	24.03	26.84	23.22	24.14	23.21	23.64	25.90
AQE Mechanical AI	M	50.22	64.14	64.96	54.01	53.47	55.55	41.20	47.93	40.90	37.51	45.78
	SD	20.94	16.76	11.09	14.15	12.66	19.90	19.69	20.80	19.51	21.65	21.90
AQE Administrative AI	M	72.68	51.37	47.67	40.14	40.00	54.30	48.44	72.27	40.21	55.94	52.49
	SD	11.25	21.68	19.83	20.09	20.94	19.90	18.99	10.83	17.96	15.49	19.53
AQE General J	M	62.69	55.45	53.57	44.94	44.14	54.50	53.76	62.06	52.46	47.44	57.46
	SD	16.68	19.91	17.80	19.89	18.59	18.93	13.55	15.97	12.78	19.77	14.72
AQE Electronics AI	M	53.42	59.28	54.45	47.14	45.82	54.82	46.49	58.00	46.53	45.98	50.77
	SD	18.93	21.02	19.25	20.23	19.13	20.74	18.21	19.15	17.86	20.74	20.13
N		691	538	373	643	1,003	714	724	1,379	1,262	1,944	2,109

Table 3. Correlations Between Race and Selected Variables^a

Variable	Air Force Specialty										
	291	473	543	551	571	605	631	645	647	702	811
Job Difficulty	-010	033	054	-062	007	-092	-093	-058	057	-086	-036
Number of Tasks Performed	016	049	058	-062	038	-056	-043	-031	060	-073	003
Average Task Difficulty per Time Unit	-078	-009	-034	-041	-026	-106	-101	-006	028	-056	-072
Reenlistment Intention	150	115	091	-030	110	055	122	123	069	101	075
Job Interest	153	022	104	-120	018	-022	-011	092	055	094	-009
Utilization of Talent	255	002	154	-040	-004	012	-005	115	037	120	022
Grade	-054	-068	000	-062	-023	-047	-040	-124	-103	-129	-074
Months in Job	074	036	-062	018	-021	109	050	-038	-036	-044	-034
Months in Career Ladder	-019	003	012	087	050	-024	-051	-062	006	-019	-001
TAFMS	-010	037	-035	051	023	-022	-048	-072	015	-061	-028
Number of Subordinates	-050	-023	-011	010	-032	-006	026	-015	-016	-032	-027
CONUS Assignment	-039	-017	011	036	-068	-020	-068	-031	-056	-093	-042
Technical School Graduation	-072	167	078	-119	018	-082	-020	-045	-097	104	-060
Years of Education	-029	010	-014	033	014	001	018	-115	-001	-095	-028
Age	-026	-036	-050	094	071	-027	-041	-090	-014	-078	-004
AFQT Centile	-325	-354	-355	-391	-387	-320	-354	-378	-340	-350	-425
AQE Mechanical AI	-231	-283	-205	-221	-217	-223	-196	-252	-180	-262	-299
AQE Administrative AI	-177	-259	-291	-229	-235	-194	-250	-217	-280	-263	-311
AQE General AI	-291	-312	-294	-223	-228	-269	-231	-282	-236	-289	-327
AQE Electronics AI	-303	-280	-307	-286	-269	-294	-209	-316	-259	-299	-341
N	691	538	373	643	1,003	714	724	1,397	1,262	1,944	2,109
Percent Blacks	12.0	8.4	18.2	21.3	23.8	14.3	23.2	11.8	22.1	23.0	23.3

^aDecimal points have been omitted. Values shown in bold type are significant at the .01 level. Positive value indicate Blacks scored higher on a particular variable.

Table 4. Predictors Used to Account for Variance in Selected Criteria

Predictor	Criterion				
	Job Difficulty Index	Number of Tasks Performed	Avg Task Difficulty Per Unit Time	Job Interest	Felt Utilization of Talents and Training
Months in Job	X	X	X	X	X
Months in Career Ladder	X	X	X	X	X
Total Months Active Military Service	X	X	X	X	X
Years of Education	X	X	X	X	X
AFQT Centile	X	X	X	X	X
AQE Mechanical AI	X	X	X	X	X
AQE Administrative AI	X	X	X	X	X
AQE General AI	X	X	X	X	X
AQE Electronics AI	X	X	X	X	X
Technical School Graduation (Yes/No)	X	X	X	X	X
Age at Enlistment	X	X	X	X	X
Job Difficulty Index				X	X
Number of Tasks Performed				X	X
Average Task Difficulty Per Unit Time				X	X
Grade				X	X
Number of Subordinates				X	X
CONUS Assignment				X	X

Table 5. Racial Differences in Terms of Number of Tasks Assigned, Average Task Difficulty per Unit Time, Job Difficulty Index, Job Interest, and Felt Utilization of Talents and Training

AFSC	Air Force Specialty	N	Validity	R ² Full Model	R ² Restricted Model	Unique Contribution of Race	F ^a
Number of Tasks Assigned							
291X0	Communications Center Specialist	691	.016	.0263	.0263	.0000	-
473X0	General Purpose Vehicle/Body Repairman	538	.049	.0513	.0613	.0000	-
543X0	Electrical Power Production Specialist	373	.058	.0594	.0594	.0000	-
551X0	Pavements Maintenance/Construction						
	Equipment Operator	643	-.062	.0527	.0451	.0076	5.06
571X0	Fire Protection Specialist	1,003	.038	.0304	.0304	.0000	-
605X0	Air Passenger/Air Cargo Specialist	714	-.056	.0465	.0429	.0036	2.65
631X0	Fuel Specialist	724	-.043	.0161	.0131	.0030	2.17
645X0	Inventory Management Specialist	1,397	-.031	.0243	.0239	.0004	0.56
647X0	Material Facilities Specialist	1,262	.060	.0209	.0202	.0007	0.89
702X0	Administrative Specialist	1,944	-.073	.0442	.0423	.0019	3.84
811X0	Security Policeman	2,109	.003	.0582	.0582	.0000	-
Average Task Difficulty Per Unit Time							
291X0	Communications Center Specialist	691	-.078	.0837	.0811	.0026	1.93
473X0	General Purpose Vehicle/Body Repairman	538	-.009	.0351	.0351	.0000	-
543X0	Electrical Power Production Specialist	373	-.034	.0821	.0821	.0000	-
551X0	Pavements Maintenance/Construction						
	Equipment Operator	643	-.041	.0295	.0269	.0026	1.69
571X0	Fire Protection Specialist	1,003	-.026	.0589	.0568	.0021	2.21
605X0	Air Passenger/Air Cargo Specialist	714	-.106	.0717	.0669	.0048	3.63
631X0	Fuel Specialist	724	-.101	.0582	.0532	.0050	3.78
645X0	Inventory Management Specialist	1,397	-.008	.0536	.0522	.0014	2.02
647X0	Material Facilities Specialist	1,262	.028	.0437	.0437	.0000	-
702X0	Administrative Specialist	1,944	-.056	.0372	.0372	.0000	-
811X0	Security Policeman	2,109	-.072	.0762	.0751	.0011	2.49
Job Difficulty Index^b							
291X0	Communications Center Specialist	691	-.010	.0398	.0398	.0000	-
473X0	General Purpose Vehicle/Body Repairman	538	.033	.0524	.0524	.0000	-
543X0	Electrical Power Production Specialist	373	.054	.0575	.0575	.0000	-
551X0	Pavements Maintenance/Construction						
	Equipment Operator	643	-.062	.0529	.0468	.0061	4.06
571X0	Fire Protection Specialist	1,003	.007	.0492	.0492	.0000	-
605X0	Air Passenger/Air Cargo Specialist	714	-.092	.0662	.0567	(-).0086	7.14*
631X0	Fuel Specialist	724	-.093	.0247	.0168	.0079	5.77
645X0	Inventory Management Specialist	1,397	-.058	.0394	.0365	.0029	4.13
647X0	Material Facilities Specialist	1,262	.057	.0334	.0328	.0006	0.78
702X0	Administrative Specialist	1,944	-.086	.0533	.0492	(-).0041	8.37*
811X0	Security Policeman	2,109	-.036	.0681	.0681	.0000	-
Job Interest^c							
291X0	Communications Center Specialist	691	.153	.1024	.0927	(+).0097	7.28*
473X0	General Purpose Vehicle/Body Repairman	538	.022	.0776	.0776	.0000	-
543X0	Electrical Power Production Specialist	373	.104	.0655	.0648	.0007	0.27
551X0	Pavements Maintenance/Construction						
	Equipment Operator	643	.120	.1323	.1247	.0073	5.26
571X0	Fire Protection Specialist	1,003	.018	.0443	.0443	.0000	-
605X0	Air Passenger/Air Cargo Specialist	714	-.022	.1214	.1211	.0003	0.24
631X0	Fuel Specialist	724	-.011	.1042	.1042	.0000	-
645X0	Inventory Management Specialist	1,397	.092	.0763	.0761	.0002	0.30
647X0	Material Facilities Specialist	1,262	.055	.0871	.0871	.0000	-
702X0	Administrative Specialist	1,944	.094	.0737	.0686	(+).0051	10.60*
811X0	Security Policeman	2,109	.009	.1098	.1083	.0015	3.52

Table 5 (Continued)

AFSC	Air Force Specialty	N	Validity	R ² Full Model	R ² Restricted Model	Unique Contribution of Race	F ^a
Felt Utilization of Talents and Training ^d							
291X0	Communications Center Specialist	691	.255	.1653	.1313	(+).0340	27.46 ^a
473X0	General Purpose Vehicle/Body Repairman	538	.002	.0796	.0796	.0000	-
543X0	Electrical Power Production Specialist	373	.154	.1153	.1053	.0100	4.02
551X0	Pavements Maintenance/Construction Equipment Operator	643	-.040	.1556	.1544	.0012	0.89
571X0	Fire Protection Specialist	1,003	-.004	.0564	.0561	.0003	0.31
605X0	Air Passenger/Air Cargo Specialist	714	.012	.1257	.1257	.0000	-
631X0	Fuel Specialist	724	-.005	.0849	.0849	.0000	-
645X0	Inventory Management Specialist	1,397	.115	.1052	.1036	.0016	2.47
647X0	Materiel Facilities Specialist	1,262	.037	.0857	.0857	.0000	-
702X0	Administrative Specialist	1,944	.120	.1100	.1034	(+).0088	14.29 ^a
811X0	Security Policeman	2,109	.022	.0767	.0767	.0000	-

^aWhere the difference between Blacks and Non-Blacks is significant at the .01 level, other variables held constant, the *F* is starred and the sign of the raw score regression weight precedes the unique contribution value.

^bBlacks in 605X0 and 811X0 scored statistically significantly lower on the Job Difficulty Index, although the difference between races on this variable was small.

^cBlacks in 291X0 and 702X0 found their jobs significantly more interesting than did Non-Blacks.

^dBlacks in 291X0 and 702X0 felt that their jobs make significantly better utilization of their talents than did Non-Blacks.

Criteria Associated with Job Assignment

Three of the criteria are associated with the nature of work being performed by incumbents in the various career ladders: (a) the number of tasks being performed; (b) the average difficulty of tasks performed per unit time; and (c) an index of job difficulty. As indicated in Table 4, the variables held constant related to age, training, aptitude, education, and experience. When these variables were held constant, it was found that there were no significant differences in the number of tasks being assigned to Blacks and Non-Blacks in the samples under consideration. Furthermore, there were no significant differences in the average difficulty levels of tasks performed, weighted by the time spent on each task. However, when these two criteria were weighted into an index of overall difficulty level (see Mead, 1971a; Mead, 1971b; Mead & Christal, 1971), it was found that Blacks were being assigned significantly less difficult jobs in two career ladders: 605X0 Air Passenger/Air Cargo and 702X0 Administrative. Although these differences were statistically significant at the .01 level, they were, nevertheless, small. In each instance, the race variable uniquely accounted for less than one percent of the criterion variance. Perhaps the most striking observation that can be made from Table 5 is that all of the predictors in the system, including race, did very little in accounting for the difficulty levels of work being

assigned to first-term airmen in the 11 ladders considered.

Job Interest and Felt Utilization of Talents and Training

Table 5 also reflects racial differences in expressed job interest and in reported utilization of talents and training. Significant racial differences appeared in only two career ladders. In each instance, however, they were in the direction that suggested the Blacks found their jobs more interesting and felt that their talents and training were being better utilized than did the Non-Blacks. These findings are unusual in two respects. First, in the case of the 291X0 Communications Center Ladder, the unique contribution of race in accounting for feelings of being well utilized had an *F* ratio of 27.48, which is highly significant. Even though the Blacks and Non-Blacks were being assigned jobs and tasks of comparable difficulty levels in this ladder, the Blacks felt that they were being better utilized. In the case of the 702X0 Administrative Career Ladder, it was found that the Blacks were being assigned jobs which were slightly less difficult than jobs assigned the Non-Blacks. In spite of this, the Blacks expressed a higher feeling of utilization and job interest than did the Non-Blacks. In the remaining nine career ladders, there were no significant differences in expressed attitudes.

V. SUMMARY AND CONCLUSIONS

First-term Black airmen were compared with first-term Non-Blacks in 11 career ladders in terms of their work assignments, job interests, and felt utilization. When experience, education, aptitude, and technical school graduation status were held constant, no racial differences were observed in the number of tasks being performed or in the average difficulty of tasks performed per unit time. However, when these two factors were weighted into an overall job difficulty composite, it was found that Blacks were performing slightly

less difficult jobs in two of the career ladders: 605X0 Air Passenger/Air Cargo and 702X0 Administrative. These differences were small, and it can be concluded that there were no practical differences in the types of assignments being given to Blacks and Non-Blacks in the 11 ladders investigated. Significant differences in job interest and felt utilization were found in two ladders, and in each instance these differences were in the direction which suggested that the Blacks in the sample found their jobs more interesting and felt a greater utilization of their talents and training than did the Non-Blacks.

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